

Half joint

Dapped end of a beam · strut-and-tie, EN 1992-1-1 §6.5, §10.9.4.6 · UK NA / PN-EN

Reference	NAE-RC-046 · version 1.0
Standards	BS EN 1992-1-1:2004 with UK NA · PN-EN 1992-1-1:2008 with Polish NA (NDP sources listed on the NDP sheet)
National Annex	Selectable: UK NA to BS EN 1992-1-1 or Polish NA to PN-EN 1992-1-1
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What it does

Design of the dapped end (half joint) of a reinforced concrete beam resting on a bearing under its nib, for a vertical reaction and a horizontal force: the strut-and-tie model with a vertical hanger, the nib tie, the hanger links, the bottom tie of the full-depth beam, the node and strut stresses, the anchorages and the nib links.

How to use

1. Open the Calculation sheet and select the National Annex.
2. Fill in the shaded input cells. Everything else is calculated.
3. Read the Results block; every step below it quotes its clause. Print or save as PDF for your calculation package.

Scope and limitations

Rectangular beam of constant width; the nib has the full width and the bearing sits under the nib. One model only: model (a) of Figure 10.4, vertical hanger links next to the re-entrant corner and a horizontal tie in the nib. Inclined bars (model (b)) and a combination of the two are not covered: the hanger carries the whole VEd. The nib is treated as an inverted corbel (6.5, Annex J.3 by analogy): moments about the nib tie at the hanger centroid, $V_{Ed} a + H_{Ed} a_H = C z$, with the top node at $k_2 v' f_{cd}$ (CCT, the hanger anchored in it), $z = d_n - y/2$ and $1 \leq \tan \theta_1 \leq 2.5$ (z kept at $2.5 a_{eq}$ when the node is shallower; $\tan \theta_1 < 1$ is outside the model: FAIL). H_{Ed} acts at the bearing, a_H below the nib tie; enter at least $0.2 V_{Ed}$ for bearings without a controlled sliding surface (common practice, flagged). Nib tie $F_{td} = C + H_{Ed}$, hanger V_{Ed} / f_{yd} , bottom tie at the foot of the hanger $V_{Ed} \cot \theta_2 + H_{Ed}$ (H_{Ed} added on the safe side), θ_2 the strut into the beam ($1 \leq \cot \theta_2 \leq$ the NA limit of 6.2.3(2)). Bearing at $k_2 v' f_{cd}$ and the strut from the bearing at $0.6 v' f_{cd}$ on its width there (6.5.2(2), 6.5.4(4)b); the node at the foot of the hanger at $k_3 v' f_{cd}$ (CTT, 6.5.4(4)c); the strut from the bearing also on the inclined face of the top node at $0.6 v' f_{cd}$ (both ends of the strut, on the safe side); $k_1 = 1.0$, $k_2 = 0.85$, $k_3 = 0.75$ and $v' = 1 - f_{ck} / 250$, the recommended values, kept by the UK NA and the PL NA. Anchorage to 8.4 beyond the last hanger link: the nib tie straight, the bottom bars straight or bent up the re-entrant face as U-bars on a mandrel of at least Table 8.1N and (8.1) with the full bar force at the bend (8.3(3), no credit for the exemptions; length along the centreline, the bend within the hanger zone), $\alpha_3 = \alpha_4 = \alpha_5 = 1$. Nib tie within $A_{s,min}$ and $A_{s,max}$ of 9.2.1.1. UK NA 6.2.3(2) (as amended 2009): $\cot \theta = 1.25$ where shear coexists with externally applied tension; a restraint force at the bearing is not external tension, so $\cot \theta_2 > 1.25$ with $H_{Ed} > 0$ is flagged for the user to confirm. U-bar legs inside the first hanger link, the nib tie inside the U-bar legs; transverse tie for the strut spreading from the bearing width to b by (6.58), taken by one transverse leg of each nib link set. Covers to the links at least 10 mm and their own size, and the bars inside them at least theirs (bond, 4.4.1.2(3)); durability covers are the user's. The anchorage of the hanger links in the top node and round the bottom tie (closed links, 8.5) is not verified. Hanger links are counted within $h_n / 2$ of the re-entrant face (this sheet's criterion: keep them close to the corner). Shear limit of the nib $0.5 b d_n v' f_{cd}$ (6.2.2(6)); nib links as for a corbel (J.3(2), (3)). A nib shallower than $h / 2$ is flagged (common guidance). Not covered: the shear design of the full-depth beam beyond the hanger (the strut into the beam and its links: RC-004), the bearing length (RC-034), the anchorage of the nib tie at the end (loops or welded bars, 10.9.4.6), crack widths, durability of the joint. Concrete classes up to C50/60, f_{yk} 400 – 500 MPa. The second-generation EN 1992-1-1:2023 is not yet implemented.

Further reading and independent cross-check

- EN 1992-1-1, 6.5, 10.9.4.6 and Figure 10.4.
- fib Bulletin 61, Design examples for strut-and-tie models.
- PCI Design Handbook, dapped-end connections.
- Kim S. Elliott, Precast Concrete Structures, half joints.

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About NA Engineering

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Revision history

v1.0 30 Oct 2026 · First issue

Project
Element
Date

Job no.
Made by
Checked

Inputs · beam and nib

Shaded cells only

	National Annex		UK NA (BS EN)	
Table 3.1	Concrete strength class		C32/40	
3.2.2	Reinforcement characteristic yield strength (400 – 500 MPa)	f_{yk}	500	MPa
8.2(2)	Maximum aggregate size	d_g	20	mm
	Beam and nib width	b	400	mm
	Full depth of the beam	h	800	mm
	Depth of the nib	h_n	450	mm
	Length of the nib (end face to the re-entrant face)	l_n	300	mm
	Bearing centre from the end of the nib	x_b	130	mm
	Bearing pad length (along the beam)	l_p	150	mm
	Bearing pad width ($\leq b$)	b_p	350	mm
4.4.1	Nominal cover to the links (all faces)	c_{nom}	35	mm

Inputs · reinforcement

	Nib tie: bar diameter	φ_t	16	mm
	Nib tie: number of bars (one layer)	n_t	5	
8.4	Nib tie: length beyond the re-entrant face	l_t	800	mm
	Hanger links: diameter	φ_h	12	mm
	Hanger links: legs per set		4	
	Hanger links: number of sets	n_h	4	
	Hanger links: spacing of the sets	s_h	58	mm
	Bottom tie of the beam: bar diameter	φ_b	20	mm
	Bottom tie: number of bars (one layer)	n_b	4	
Table 8.2	Bottom tie at the re-entrant face		U-bars bent up	
	Nib links: diameter	φ_l	10	mm
J.3(3)	Nib links: vertical sets (2 legs each)	n_{lv}	2	
J.3(2)	Nib links: horizontal sets (2 legs each)	n_{lh}	4	
6.2.3(2)	Strut into the beam at the foot of the hanger $\cot \theta_2$	$\cot \theta_2$	1.00	

Inputs · actions

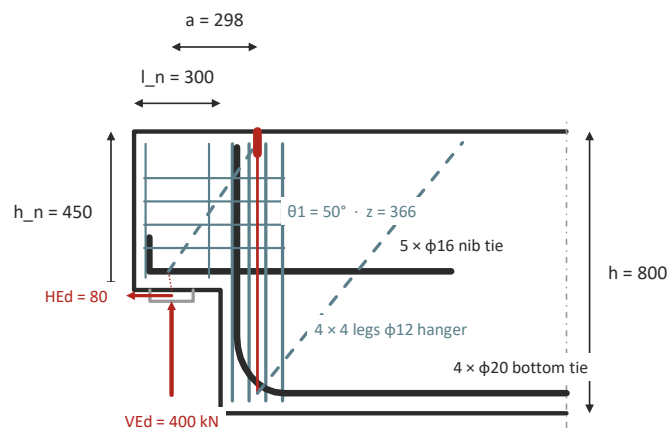
ULS design values

	Vertical reaction on the bearing	V_{Ed}	400	kN
	Horizontal force at the bearing (outwards, $\geq 0.2 V_{Ed}$ advised)	H_{Ed}	80	kN
	Inputs valid and consistent			OK

Results

Nib tie $A_{s,prov} / \max(A_{s,req}; A_{s,min})$	$A_{s,t}$	1.05		OK
Hanger $A_{s,prov} / (V_{Ed} / f_{yd})$ (zone $\leq h_n / 2$)	$A_{s,h}$	1.97		OK
Bottom tie $A_{s,prov} / A_{s,req}$	$A_{s,b}$	1.14		OK
Nodes and struts largest σ / limit (top node: 1.00 unless capped)		1.00		OK
Anchorage beyond the hanger smallest margin (available – lbd)		91	mm	OK
Shear limit of the nib $V_{Ed} / (0.5 b d_n v_{fcd})$		0.45		OK
Nib links (Annex J.3 by analogy)		horizontal		OK
Truss valid ($1 \leq \tan \theta_1$; top node within dn) · z_0 / a	z_0 / a	1.18		OK

Your half joint, to scale · elevation · struts (dashed), hanger tie (red) and the top node of the truss; bars and links as entered



No real y: the compression at the top of the nib exceeds the node strength — within the beam, deepen the nib or raise the concrete cross; $z_0 / a \geq 1$, the nib is too slender for the model — deepen the nib or bring the bearing and the hanger closer together.

Calculation · materials

2.4.2.4(1)	Partial factor, concrete	γ_c	1.50	NDP sheet
2.4.2.4(1)	Partial factor, reinforcement	γ_s	1.15	NDP sheet
3.1.6(1)	Coefficient on compressive strength (flexure)	α_{cc}	0.85	NDP sheet
3.1.6(1)	Coefficient on compressive strength (shear)	α_{cc}	1.00	NDP sheet
3.1.6(2)	Coefficient on tensile strength	α_{ct}	1.00	NDP sheet
6.2.2(1), 6.4.4(1)	Coefficient 0.18 / γ_c	$C_{Rd,c}$	0.120	NDP sheet
6.2.3(2)	Upper limit of $\cot \theta$	$\cot \vartheta_{max}$	2.50	NDP sheet
Table 3.1	Characteristic cylinder strength	f_{ck}	32	MPa
Table 3.1	Mean tensile strength	f_{ctm}	3.02	MPa
3.1.6(1)	Design compressive strength $\alpha_{cc} f_{ck} / \gamma_c$	f_{cd}	18.13	MPa
3.2.7	Design yield strength	f_{yd}	434.8	MPa
(6.5.7N)	$v' = 1 - f_{ck} / 250$	v'	0.872	
6.5.4(4)b	CCT node limit $k_2 v' f_{cd}$, $k_2 = 0.85$	$\sigma_{Rd,CCT}$	13.44	MPa
6.5.4(4)c	CTT node limit $k_3 v' f_{cd}$, $k_3 = 0.75$	$\sigma_{Rd,CTT}$	11.86	MPa
6.5.2(2)	Strut in a cracked zone $0.6 v' f_{cd}$	$\sigma_{Rd,max}$	9.49	MPa

Calculation · nib as an inverted corbel

Nib tie above the nib soffit $c + \phi_l + \phi_t / 2$	a_H	53.0	mm
Effective depth of the nib $h_n - a_H$	d_n	397.0	mm

	First hanger set from the end $\ln + c + \phi h / 2$	x_{h1}	341.0	mm	
	Hanger centroid $xh1 + (nh - 1) sh / 2$	x_h	428.0	mm	
	Last hanger link, far face $xh1 + (nh - 1) sh + \phi h / 2$	x_{hf}	521.0	mm	
	Lever of VEd $a = xh - xb$	a	298.0	mm	
6.5	Moment about the nib tie at the hanger $VEd a + HEd aH$	M_t	123440	kNm	
6.5	Where the resultant of VEd and HEd meets the tie M_t / VEd	a_{eq}	308.6	mm	$a_{eq} = a$ when $HEd = 0$
6.5.4(4)b	Top node depth $dn - \sqrt{dn^2 - 2 M_t / (b \sigma_{Rd,CCT})}$	y_0	62.8	mm	N/A: node crushed
J.3(1)	Lever arm $z0 = dn - y0 / 2$	z_0	365.6	mm	
J.3(1)	$z0 / a_{eq} (> 1.0$: short nib)	$z_{0/a}$	1.185		
J.3(1)	Lever arm used $\min(z0; 2.5 a_{eq})$ ($\tan \theta_1 \leq 2.5$)	z	365.6	mm	
	Top node depth used $2(dn - z)$ ($= y0$ unless capped)	y	62.8	mm	
J.3(1)	Strut inclination $\tan \theta_1 = z / a_{eq}$	$\tan \theta_1$	1.185		
	Tie node from the end $xh - a_{eq} (\geq c + \phi l + \phi t / 2)$	x_A	119.4	mm	
6.5	Compression at the top node M_t / z	C	337.6	kN	
6.5	Nib tie force $C + HEd$	F_{td}	417.6	kN	
6.5	Strut force $\sqrt{(VEd^2 + C^2)}$	F_c	523.4	kN	

Calculation · ties

	Nib tie required F_{td} / f_{yd}	$A_{s,t,req}$	961	mm ²	
	Nib tie provided $nt \pi \phi^2 / 4$	$A_{s,t}$	1005	mm ²	
9.2.1.1(1)	Minimum $\max(0.26 f_{ctm} / f_{yk}; 0.0013) b dn$	$A_{s,min}$	250	mm ²	
9.2.1.1(3)	Maximum $0.04 b h_n$	$A_{s,max}$	7200	mm ²	
8.2(2)	Minimum clear gap $\max(\phi t; dg + 5; 20)$	a_{min}	25	mm	
	Side offset of the nib tie $c + \phi l$ (U-bars: inside their legs, $c + \phi h$)	e_t	67	mm	
	Clear gap of the nib tie bars $(b - 2 e_t - nt \phi t) / (nt - 1)$	a_t	47	mm	
6.5, 9.2.1.1	Nib tie $\max(A_{s,req}; A_{s,min}) \leq A_{s,t} \leq A_{s,max}$, bars fit	$A_{s,t}$	1005	mm ²	OK
10.9.4.6	Hanger required VEd / f_{yd} (model (a): all of VEd)	$A_{s,h,req}$	920	mm ²	
	Hanger provided $nh \cdot \text{legs} \cdot \pi \phi h^2 / 4$	$A_{s,h}$	1810	mm ²	
	Hanger zone from the re-entrant face $x_{hf} - \ln$ ($\leq h_n / 2$)	l_{hz}	221.0	mm	
8.2(2)	Minimum clear gap $\max(\phi h; dg + 5; 20)$	$a_{h,min}$	25	mm	
	Clear gap between hanger sets $sh - \phi h$	a_h	46	mm	
	Gap of the legs across $(b - 2c - \text{legs} \phi h) / (\text{legs} - 1)$	$a_{h,b}$	94	mm	
10.9.4.6, 8.2(2)	Hanger $A_{s,h} \geq VEd / f_{yd}$, within $h_n / 2$, links fit	$A_{s,h}$	1810	mm ²	OK
6.5	Bottom tie at the foot of the hanger $VEd \cot \theta_2 + HEd$	F_b	480.0	kN	
	Bottom tie required F_b / f_{yd}	$A_{s,b,req}$	1104	mm ²	
	Bottom tie provided $nb \pi \phi b^2 / 4$	$A_{s,b}$	1257	mm ²	
8.2(2)	Minimum clear gap $\max(\phi b; dg + 5; 20)$	$a_{b,min}$	25	mm	
	Clear gap of the bottom bars $(b - 2(c + \phi h) - nb \phi b) / (nb - 1)$	a_b	75	mm	
6.5, 8.2(2)	Bottom tie $A_{s,b} \geq A_{s,b,req}$ and the bars fit	$A_{s,b}$	1257	mm ²	OK

Calculation · nodes and struts

6.5.4(4)b	Bearing stress $VEd / (lp bp)$	σ_{Ed}	7.62	MPa	
6.5.4(4)b	Bearing node $\sigma_{Ed} \leq \sigma_{Rd,CCT}$	σ_{Ed}	7.62	MPa	OK
6.5.4(4)b	Strut width at the bearing $lp \sin \theta_1 + 2 aH \cos \theta_1$	w_A	183.0	mm	
6.5.2(2)	Strut stress at the bearing $F_c / (bp w_A)$	σ_A	8.17	MPa	
6.5.2(2)	Strut $\sigma_A \leq 0.6 v' f_{cd}$	σ_A	8.17	MPa	OK
6.5.4(4)b	Top node $C / (b y)$ ($\leq \sigma_{Rd,CCT}$; hydrostatic)	σ_B	13.44	MPa	
6.5.4(4)b	Top node $\sigma_B \leq \sigma_{Rd,CCT}$	σ_B	13.44	MPa	OK
	Width of the hanger zone $(nh - 1) sh + \phi h$	l_h	186.0	mm	
6.5.4(4)b	Strut face at the top node $y \cos \theta_1 + l_h \sin \theta_1$	w_B	182.6	mm	
6.5.2(2)	Strut stress on that face $F_c / (b w_B)$	σ_{AB}	7.16	MPa	
6.5.2(2)	Strut at the top node $\sigma_{AB} \leq 0.6 v' f_{cd}$	σ_{AB}	7.16	MPa	OK
	Bottom tie above the soffit $c + \phi h + \phi b / 2$	u_b	57.0	mm	
6.5	Strut into the beam $VEd / \sin \theta_2 = VEd \sqrt{1 + \cot^2 \theta_2}$	F_{c2}	565.7	kN	
6.5.4(4)c	Strut width, foot of the hanger $l_h \sin \theta_2 + 2 u_b \cos \theta_2$	w_C	212.1	mm	
6.5.4(4)c	Node at the foot of the hanger $F_{c2} / (b w_C)$	σ_C	6.67	MPa	

6.5.4(4)c	CTT node $\sigma_C \leq \sigma_{Rd,CTT}$	σ_C	6.67	MPa	OK
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Calculation · anchorage beyond the hanger, 8.4

3.1.6(2), 8.4.2(2)	fctd (fctk, 0.05 not above the C60/75 value)	f_{ctd}	1.41	MPa	
Bond (Figure 8.2, cast horizontally): $\eta_1 = 1$ if $h \leq 250$, if the bar is within 250 of the bottom ($h \leq 600$) or at least 300 below the top ($h > 600$); 0.7 otherwise.					
Figure 8.2	η_1 , nib tie (good bond 1.0, else 0.7)	$\eta_{1,t}$	1.0		
(8.2)	Bond stress, nib tie $2.25 \eta_1 \eta_2 f_{ctd}$	$f_{bd,t}$	3.18	MPa	
8.4.3(2)	Stress in the nib tie $F_{td} / A_{s,t} (\leq f_{yd})$	$\sigma_{sd,t}$	415.4	MPa	
(8.3)	Basic length $\phi t_{osd} / (4 f_{bd})$	$l_{b,rqd,t}$	523	mm	
Figure 8.3	Cover dimension $\min(a_t / 2; e_t)$	$c_{d,t}$	23	mm	
Table 8.2	α_2 straight $1 - 0.15 (cd - \phi) / \phi (0.7 - 1.0)$	$\alpha_{2,t}$	0.932		
(8.4), (8.6)	$l_{bd} = \max(\alpha_2 l_{b,rqd}; 0.3 l_{b,rqd}; 10 \phi; 100)$	$l_{bd,t}$	488	mm	
	Available beyond the last hanger link $l_t - (x_{hf} - l_n)$	$l_{av,t}$	579	mm	
8.4	Nib tie available $\geq l_{bd}$		579	mm	OK
Figure 8.2	η_1 , bottom tie (at u_b from the bottom)	$\eta_{1,b}$	1.0		
(8.2)	Bond stress, bottom tie $2.25 \eta_1 \eta_2 f_{ctd}$	$f_{bd,b}$	3.18	MPa	
8.4.3(2)	Stress in the bottom tie $F_b / A_{s,b} (\leq f_{yd})$	$\sigma_{sd,b}$	382.0	MPa	
(8.3)	Basic length $\phi b_{osd} / (4 f_{bd})$	$l_{b,rqd,b}$	602	mm	
Figure 8.3	Cover dimension $\min(a_b / 2; c + \phi h)$	$c_{d,b}$	38	mm	
Table 8.2	α_1 (U-bar with $cd > 3 \phi$: 0.7)	$\alpha_{1,b}$	1.00		
Table 8.2	α_2 straight ($cd - \phi$), U-bar ($cd - 3\phi$): $1 - 0.15 (...) / \phi$	$\alpha_{2,b}$	1.000		
(8.4), (8.6)	$l_{bd} = \max(\alpha_1 \alpha_2 l_{b,rqd}; 0.3 l_{b,rqd}; 10 \phi; 100)$	$l_{bd,b}$	602	mm	
Bottom tie length available from the far face of the last hanger link (6.5.4(7)): straight bars to the end cover at the re-entrant face; U-bars along the centreline round the mandrel ϕ_m (the larger of Table 8.1N, 4ϕ up to $\phi 16$ and 7ϕ above, and (8.1) for the concrete inside the bend with the full bar force) and up the re-entrant face to the top cover.					
8.3(3)	Force in one bar at the bend $\sigma_{sd} \pi \phi b^2 / 4$ (no bond credit)	F_{bt}	120.0	kN	
8.3(3)	a_b $\min(\text{half the bar spacing}; c + \phi h + \phi b / 2)$	a_b	47.7	mm	
(8.1)	Mandrel for the concrete $F_{bt} (1/a_b + 1/(2 \phi b)) / f_{cd}$	$\phi_{m,c}$	304	mm	
Table 8.1N, 8.3	Mandrel $\max(\text{Table 8.1N}; (8.1))$	ϕ_m	304	mm	
	U-bar: centreline radius of the bend $\phi_m / 2 + \phi b / 2$	r_b	162.1	mm	
8.4.4	Available along the bar from the last hanger link	$l_{av,b}$	792	mm	
8.4, 8.3	Bottom tie available $\geq l_{bd}$; a U-bar's bend within the hanger zone		792	mm	OK

Calculation · shear of the nib and nib links

3.1.6(1)	Design compressive strength for shear	$f_{cd,v}$	21.33	MPa	
(6.6N)	$v = 0.6 (1 - f_{ck} / 250)$	v	0.523		
6.2.2(6)	Shear limit $0.5 b d_n v f_{cd}$	V_{max}	886.2	kN	
6.2.2(6)	Shear $V_{Ed} \leq 0.5 b d_n v f_{cd}$	V_{Ed}	400	kN	OK
6.2.2(1)	Size factor $1 + v(200 / d_n) \leq 2$	k	1.710		
6.2.2(1)	$\rho_l = A_{s,t} / (b d_n) \leq 0.02$	ρ_l	0.0063		
(6.2)	Shear resistance of the nib without links	$V_{Rd,c}$	88.8	kN	
J.3	Bearing centre to the re-entrant face $l_n - x_b$	a_c	170.0	mm	
J.3(2)	Horizontal links ($a_c \leq 0.5 h_n$) $0.5 A_{s,t}$ (PL NA.8; UK PD 6687)	$A_{s,lnk,h}$	503	mm ²	
	Horizontal links provided $n_{lh} \cdot 2 \pi \phi_l^2 / 4$	$A_{s,lnk,h}$	628	mm ²	
J.3(3)	Vertical links ($a_c > 0.5 h_n$, $V_{Ed} > V_{Rd,c}$) $0.5 V_{Ed} / f_{yd}$	$A_{s,lnk,v}$	0	mm ²	
	Vertical links provided $n_{lv} \cdot 2 \pi \phi_l^2 / 4$	$A_{s,lnk,v}$	314	mm ²	
8.2(2)	Minimum clear gap between links $\max(\phi_l; d_g + 5; 20)$	$a_{l,min}$	25	mm	
	Clear gap, horizontal links $(2 d_n / 3) / n_{lh} - \phi_l$	a_{lh}	56	mm	
8.2(2)	Clear gap, first horizontal link above the nib tie	a_{lt}	53	mm	
	Clear gap, vertical links $(l_n - 2c - n_{lv} \phi_l) / (n_{lv} - 1)$	a_{lv}	210	mm	
(6.58)	Transverse tie, strut spreading from b_p to b $0.25 (1 - b_p / b) F_c$	T_{tr}	16.4	kN	
6.5.3(3)	Needed across the nib T_{tr} / f_{yd}	$A_{s,tr}$	38	mm ²	
	Provided: one transverse leg per nib link set $(n_{lv} + n_{lh}) \pi \phi_l^2 / 4$	$A_{s,tr}$	471	mm ²	
J.3, 6.5.3(3)	Nib links provided $\geq$ needed (J.3 and transverse), they fit		503	mm ²	OK
	Horizontal force $H_{Ed} \geq 0.2 V_{Ed}$ (common practice, no sliding surface)				OK
6.2.3(2)	UK NA: $\cot \theta \leq 1.25$ with external tension; H_{Ed} from restraint?				OK

Anchor the nib tie at the end of the nib beyond the outer edge of the bearing with loops or welded transverse bars (10.9.4.6, Figure 10.4), and close the hanger links round the top bars and the bottom tie (8.5; not verified by this sheet). The strut into the beam at $\varnothing 2$ and the links beyond the hanger belong to the shear design of the beam (6.2.3, with the same cot $\varnothing 2$). A nib shallower than about half the beam depth is unusual; consider inclined bars (model (b) of Figure 10.4) as well, not covered here.

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Nationally Determined Parameters

Values used by the Calculation sheet for the selected National Annex. Sources: UK NA to BS EN 1992-1-1:2004, Table NA.1; PN-EN 1992-1-1:2008, Załącznik krajowy NA. Edit only if your project specifies different values.

Parameter	Clause	UK NA	PL NA	Notes
Partial factor, concrete γ_c	2.4.2.4(1)	1.5	1.4	Persistent & transient. UK NA: recommended; PL: NA.2, Table NA.2
Partial factor, reinforcement γ_s	2.4.2.4(1)	1.15	1.15	UK NA: recommended; PL: NA.2, Table NA.2
α_{cc} (compression in flexure / axial)	3.1.6(1)	0.85	1	UK NA: 0.85; PL: recommended (NA.9)
$\alpha_{cc,pl}$ (plain concrete, compression)	12.3.1(1)	0.6	0.8	UK NA Table NA.1: 0.6; PL: recommended (NA.9)
α_{cc} (shear and punching)	3.1.6(1)	1	1	UK NA: 1.0 for other phenomena; PL: recommended (NA.9)
α_{ct} (design tensile strength)	3.1.6(2)	1	1	Recommended value in both annexes
CRd,c numerator (CRd,c = value / γ_c)	6.2.2(1), 6.4.4(1)	0.18	0.18	Recommended value in both annexes
k1 (axial stress term, punching)	6.4.4(1)	0.1	0.1	Recommended value in both annexes
vRd,max factor (vRd,max = factor · v · fcd)	6.4.5(3)	0.5	0.4	UK NA: 0.5 v fcd; PL: recommended value (NA.9), 0.4 v fcd since EN 1992-1-1 AC:2010 (PN-EN 1992-1-1:2008)
kmax (vEd ≤ kmax · vRd,c at u1)	6.4.5	2	1.5	UK NA 6.4.5(3): 2 vRd,c. PL: no limit in PN-EN 1992-1-1:2008; 1.5 (A1:2014 recommendation) applied conse
ϕ_{large} (large bar threshold, mm)	8.8(1)	40	32	UK NA: 40 mm; PL: 32 mm recommended (NA.9)
cot θ upper limit (variable strut)	6.2.3(2)	2.5	2	UK NA: 2.5 (1.25 with axial tension); PL: NA.4, $1 \leq \cot \theta \leq 2.0$
k1 (x/d limit, $\delta \geq k1 + k2 x_u/d$)	5.5(4)	0.4	0.44	UK NA for $f_{yk} \leq 500$ MPa; PL: recommended (NA.9)
k2 (x/d limit, $\epsilon_{cu2} = 0.0035$)	5.5(4)	1	1.25	UK NA: $0.6 + 0.0014/\epsilon_{cu2}$; PL: $1.25(0.6 + 0.0014/\epsilon_{cu2})$
Upper limit on the (310/ σ_s) factor (0 = none)	7.4.2(2)	1.5	0	UK NA Table NA.5 Note 5: (310/ σ_s) or (500/ f_{yk})($A_s,prov/A_s,req$) ≤ 1.5; PL: none
L/d not to exceed 40 K (1 = applies)	7.4.2(2)	1	0	UK NA Table NA.5 Note 6; not in EN text
ϕ_{min} (longitudinal bars in columns, mm)	9.5.2(1)	12	6	UK NA: 12 mm; PL: NA.6, 6 mm
k3 (crack spacing)	7.3.4(3)	3.4	3.4	Recommended value in both annexes
k4 (crack spacing)	7.3.4(3)	0.425	0.425	Recommended value in both annexes